REMARKS

Claim 1 was amended at section iii) to reflect an obvious clerical error (i.e. section iii) should not have started with "weight average molecular weight/number average molecular weight,").

The invention defined by the present claims relates to an injection molded (hereinafter "I/M") container which is characterized by a unique balance of properties, which properties might be qualitatively described as:

i) a high degree of stiffness at high temperature (which allows the container to be filled at elevated temperatures); and

ii) excellent drop strength.

These properties are quantitatively defined by the claims. Specifically, the container is characterized by having both of:

i) a Vicat softening point in excess of 121°C (which illustrates that the container has stiffness/rigidity at a high temperature); and

ii) a drop strength value of greater than 2.5 feet as measured by ASTM D5276.

Applicants acknowledge that it has previously been possible to produce injection molded polyethylene containers having a high stiffness. For example, this may be achieved by using a polyethylene having a very high density. However, these stiff/rigid containers of the prior art are comparatively brittle – and these prior art brittle

containers do not exhibit the high drop strength of the containers of the present invention.

Applicants also acknowledge that it has previously been possible to produce injection molded polyethylene containers having good drop strength. For example, this may be achieved by using a polyethylene having a lower density and/or a lower molecular weight (or viscosity). However, these impact resistant containers of the prior art have comparatively lower Vicat softening points.

The I/M containers of the present invention are characterized by having a unique combination of the above described desirable properties, namely a high Vicat softening point and good drop strength.

The containers of the present invention are prepared from a very narrowly defined type of polyethylene. While not wishing to be bound by theory, it is believed that the excellent balance of properties of the present I/M containers is a result of a combination of all of the characteristics of the specific polyethylene which is defined in the claims. In particular, the polyethylene must meet all of the following conditions:

a) it must be a copolymer; and

b) it must have a comparatively high density (of from 0.950 to 0.955 g/cc); and

c) it must have a viscosity of less than 3.5 Pascal seconds at a temperature of 280°C and a sheer rate of 100,000 sec^{1}; and

d) it must have a comparatively narrow molecular weight distribution Mw/Mn of from 2.2 to 2.8; and

e) it must have a hexane extractables content of less than 0.5 weight%.

The examples show that a "single" polyethylene (i.e. one which does not contain a second polyethylene which is blended into the composition after the polymerization reaction) may be used to achieve this result.

Applicants respectfully submit that a person or company who is undertaking an injection molding process would prefer to use a "single" polyethylene as opposed to a post-reactor blend because the use of a post reactor blend may increase costs and/or process complexities.

Claims 1-3 were rejected under 35 USC 103(a) as being unpatentable over U.S.P. 5,804,660 (hereinafter Whetten et al. '660) in view of USP 5,747,594 (hereinafter de Groot et al. '594).

Whetten et al. '660 disclose injection molded containers which are made with a polymer blend which is characterized by the use of a specific impact modifier. The impact modifier is generally included an amount of from 1-25 weight%. The impact modifier must have a very low density (specifically, from 0.85 g/cc to 0.91 g/cc). The impact modifier also must be a "homogenous linear ethylene/$\alpha\alpha$-olefin copolymer". Additional properties of these impact modifier copolymers are described at column 8 of Whetten et al. '660. Whetten et al. '660 add the impact modifier to "at least one

polyolefin" which is present in an amount of from 75 to 95 weight% of the total, impact-modified composition.

The "at least one" polyolefin may either be polypropylene or a polyethylene having a density of from 0.920 to 0.960 g/cc.

The examiner noted that the teachings of Whetten et al. '660 also encompass a preference for a narrow molecular weight distribution (with respect to column 8, lines 60-62). However, applicants respectfully note that the teaching at column 8, lines 60-62 is with respect to the "impact modifier" (i.e. the minor component of the blends of Whetten et al. '660). Moreover, this impact modifier must have a very low density (of from 0.85 to 0.91 g/cc). That is, Whetten et al. '660 do not specify the use of a narrow molecular weight distribution for the overall composition which is to be injection molded.

In other words, Whetten et al. '660 teach the use of a very low density impact modifier which has a narrow molecular weight distribution. Whetten et al. '660 do not teach or suggest the criticality of using an overall I/M composition which has a high density and/or a narrow molecular weight distribution. In fact, the examples which illustrate the disclosure of Whetten et al. '660 use a polyethylene having a broad molecular weight distribution (see the description of the Examples, particularly at column 12, lines 48-54, and column 13, lines 49-52).

Furthermore, Whetten et al. '660 in no way teach or suggest the criticality of using an overall I/M composition which has a density of from 0.950 to 0.955 g/cc. This

is made particularly clear by a consideration of the data which are provided by Whetten et al. '660 - none of the inventive I/M composition of Whetten et al. '660 have a density of from 0.950 to 0.955 g/cc.

Thus, Whetten et al. '660 generally disclose the impact modification of at "least one polyolefin" using a specific impact modifier. The impact modifier has a very low density (0.85 to 0.91 g/cc) and a narrow molecular weight distribution.

However, Whetten et al. '660 do not provide any teachings with respect to the criticality of either the density or the molecular weight distribution of either the "at least one polyolefin" which is to be impact modified or the corresponding density and molecular weight properties of the overall I/M composition. In fact, to the extent that these properties are exemplified, Whetten et al. '660 might be said to teach away from the polyethylenes which are used in the present invention (given the comparatively low density and broad molecular weight distribution of the composition exemplified by Whetten et al. '660).

Turning now to the physical properties of the I/M containers disclosed by Whetten et al. '660.

The examiner has noted that Whetten et al. '660 do not disclose the Vicat softening temperature of their I/M parts.

Moreover, and more importantly, applicants respectfully submit that Whetten et al. '660 in no way teach or suggest an I/M part having both a Vicat softening temperature in excess of 121°C and good drop strength.

As previously noted, claims 1-3 were rejected under 35 US 103 as being obvious in view of Whetten et al. '660 combined with de Groot et al. '594. The judical test for obviousness is set out in *Graham vs. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)).

The test requires the following factual inquiries:

1) Determining the scope and contents of the prior art.

2) Ascertaining the differences between the prior art and the claims at issue.

3) Resolving the level of ordinary skill in the pertinent art.

4) Considering objective evidence present in the application indicating obviousness or non-obviousness.

The teachings of Whetten et al. '660 are generally described above. Several important differences between the teachings of Whetten et al. '660 and the I/M parts of the present invention have also been described.

The differences include:

1) Whetten et al. '660 do not disclose any Vicat softening point data (in particular Whetten et al. '660 do not teach or suggest a Vicat softening temperature in excess of 121°C);

2) Whetten et al. '660 do not teach or suggest that an I/M container having good drop strength may be prepared from a polyethylene copolymer having a density of greater than 0.950 g/cc. (In fact, applicants respectfully submit that

the teaching of Whetten et al. '660, where considered as a whole, teach away from this finding. That is, Whetten et al. '660 generally disclose the use of a very low density impact modifier to improve impact strength. Moreover, Whetten et al. '660 do not exemplify any "inventive" I/M containers made from a polyethylene composition having a density in excess of 0.950 g/cc);

3) In view of the above, applicants respectfully submit that Whetten et al. '660 in no way teach or suggest a I/M part having a combination of high Vicat softening point and good drop strength.

Moreover, applicants respectfully submit that Whetten et al. '660 in no way teach or suggest the criticality of the selected polyethylene which is used in the present invention. Specifically:

4) Whetten et al. '660 do not teach or suggest the critical use of a polyethylene copolymer having a density of greater than 0.950 g/cc; and

5) Whetten et al. '660 do not teach or suggest the critical use of a polyethylene copolymer having a molecular weight distribution of from 2.2 to 2.8.

The *Graham vs. John Deere Co.* test also requires that these differences be considered in the context of a person of ordinary skill in the pertinent art. In this context, applicants acknowledge that the examiner has admitted that Whetten et al. '660 do not disclose Vicat softening point (or hexane extractables). The examiner has argued that it would require only routine experimentation to determine an optimum

Vicat softening point. Applicants admit that such tests are routine, but applicants respectfully submit that this determination of Vicat softening point of the I/M parts taught by Whetten et al. '660 would not lead to the present invention.

Specifically, the present invention requires a combination of a high Vicat softening point and a good drop strength.

Moreover, it will be recognized by those skilled in the art that a type of "trade-off" exists between Vicat softening point and impact strength. It is generally known that improved impact strength may be achieved by lowering the density – but at the expense of Vicat softening point. This "trade-off" is discussed, for example, in de Groot et al. '594 at column 1, lines 54-65. The inventive examples of Whetten et al. '660 have low density and good impact strength. However, Whetten et al. '660 do not teach the Vicat softening point of these parts.

Applicants respectfully submit that this silence (about Vicat softening point) should not be construed as indicating that the I/M parts taught by Whetten et al. '660 have a high Vicat softening point. In fact, the low density of the I/M parts of Whetten et al. '660 strongly suggests that these parts will not have a high Vicat softening point.

In contrast, the present invention teaches and claims the use of polyethylene having a density greater than 0.950 g/cc – and the resulting I/M parts are expressly shown to have a high Vicat softening point.

In addition, applicants specify the use of a polyethylene having a narrow molecular weight distribution (Mw/Mn) of from 2.2 to 2.8. Applicants believe that this is critical to the present invention, and Whetten et al. '660 do not teach or suggest it.

Thus, applicants respectfully submit that no combination of the teachings of the prior art would lead a person of ordinary skill in the art to the present invention. Simply stated: applicants respectfully submit that no combination of the cited prior art suggests or makes obvious the use of an ethylene copolymer having a very high density of from 0.950 to 0.955 g/cc; a comparatively narrow molecular weight distribution of from 2.2 to 2.8 to prepare the I/M container of the present invention.

The claims were rejected in view of a combination of the teachings of Whetten et al. '660 with those of de Groot et al. '594.

The examiner relied upon de Groot et al. '594 to argue that "a high Vicat softening point promotes heat restraints and are more economically prepared...." (with reference to column 2 lines 4-20). Applicants admit that a high Vicat softening point improves heat resistivity.

However, the present invention is directed towards an I/M container which is prepared from a high density ethylene copolymer having a very high Vicat softening point (in excess of 121°C).

The teaching of de Groot et al. '594 relate to blends of low density polyethylene (where the first blend component has a density of from 0.85 to 0.92 g/cc and the second blend component has a density of from 0.89 to 0.942 g/cc). As will be

appreciated by those skilled in the art, the Vicat softening points of such resins are comparatively low. This may be confirmed with reference to Figure 2 of de Groot et al. '594 (where the maximum Vicat softening temperature of the resins illustrated by de Groot et al. '594 is less than 120°C). Further confirmation of the low Vicat softening points of the resins exemplified in de Groot et al. '594 is obtained with reference to the data provided in the Examples.

In any event, de Groot et al. '594 in no way teach or suggest an I/M container having both a high Vicat softening point and good drop strength. Additionally, de Groot et al. '594 make absolutely no teaching or suggestion that such an I/M container having a good balance of Vicat softening and drop strength may be prepared using a polyethylene copolymer.

In summary, applicants respectfully submit that the amended application is in condition for allowance and such allowance is respectfully submitted.

Respectfully submitted,

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